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EXAMINER

STONER, KILEY SHAWN

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 05/29/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/052,089

Applicant(s)

SESHAN ET AL.

Examiner

Kiley Stoner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 24-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-36 is/are allowed.
- 6) ☒ Claim(s) 1,3,6-8,10 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 2,4,5,9,24-27,31 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I (claims 1-10) in Paper No. 4 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 6-8 and 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh (6,180,505 B1). Uzoh teaches forming a protective structure over a metallization copper pad, wherein the metallization copper pad makes contact with a device, and wherein the protective structure includes a metal first film disposed above and on the metallization copper pad and a metal second film disposed above and on the metal first film; and at the metal second film, wire bonding the device (abstract; Figures 3-9; column 2, lines 23-36; column 5, line 63-column 6, line 56; and column 7, lines 13-53); forming the metal first film by a process selected from PVD, CVD, electroplating and electroless plating; and forming the metal second film by a process selected from

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PVD, CVD, electroplating and electroless plating (column 2, lines 34-35; column 5, lines 51-62; and column 6, lines 21-42); metal first film selected from Cu or NiP (column 2, lines 23-35; column 5, line 51-column 6, line 56; column 6, lines 21-42; and column 7, lines 13-53); metal second film is selected from gold, dore, platinum and aluminum (column 2, lines 34-35; column 5, lines 51-62; and column 6, lines 21-42); the metallization copper pad is a nickel-coated copper pad, wherein the metal first film is formed by electroless plating, and the electroless plating includes from zero to at least one primary reducing agent in a concentration range from about 1 gram/liter to about 30 gram/liter; and from zero to at least one secondary reducing agent in a concentration range from about 0 gram/liter to about 2 gram/liter; and wherein the metal second film is formed by electrolessly plating gold (column 2, lines 23-35; column 5, line 51-column 6, line 56; column 6, lines 21-42; and column 7, lines 13-53). Claims 29-30 do not require a primary reducing agent or a secondary reducing agent because of the from zero to at least one language used by the applicant.

Claims 1, 3 and 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Edelstein et al. (6,457,234 B1). Edelstein et al. teaches forming a protective structure over a metallization copper pad, wherein the metallization copper pad makes contact with a device, and wherein the protective structure includes a metal first film disposed above and on the metallization copper pad and a metal second film disposed above and on the metal first film; and at the metal second film, wire bonding the device (abstract; Figure 9; column 8, lines 4-45; and column 10, lines 36-67); forming a passivation structure that exposes at least a portion of the metallization copper pad (Figure 9; and

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column 3, line 41-column 4, line 20); forming the metal first film by a process selected from PVD, CVD, electroplating and electroless plating; and forming the metal second film by a process selected from PVD, CVD, electroplating and electroless plating (column 8, lines 4-45; column 9, lines 46-55; and column 10, lines 36-67); metal first film selected from Ni, Pd, Au or NiP (column 8, lines 4-45 and column 10, lines 36-67); metal second film is selected from gold, dore, platinum and aluminum (column 8, lines 4-45 and column 10, lines 36-67).

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagasaka et al. (5,308,686). Nagasaka et al. teaches forming a protective structure over a metallization copper pad, wherein the metallization copper pad makes contact with a device, and wherein the protective structure includes a metal first film disposed above and on the metallization copper pad and a metal second film disposed above and on the metal first film; and at the metal second film, wire bonding the device (Figures 1 or 7; column 3, lines 39-54); forming the metal first film by a process selected from PVD, CVD, electroplating and electroless plating; and forming the metal second film by a process selected from PVD, CVD, electroplating and electroless plating (column 3, line 55-column 4, line 6 and column 4, lines 23-26).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh (6,180,505 B1), Edelstein et al. (6,457,234 B1) or Nagasaka et al. (5,308,686) as applied to claim 1, further in view of Lin (6,301,121 B1). Uzoh, Edelstein et al. and Nagasaka et al. teach all of the limitations of the claim except removing the wire bonding; and replacing the wire bonding device.

Lin teaches electroless removing the wire bonding; and replacing the wire bonding device (column 3, lines 11-22; column 5, line 21-column 7, line 15; and column 8, lines 9-40). At the time of the invention it would have been obvious to combine the wire bonding of Uzoh, Edelstein et al. or Nagasaka et al. with the repair method of Lin in order to fabricate a working wire bond device.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh (6,180,505 B1), Edelstein et al. (6,457,234 B1) or Nagasaka et al. (5,308,686) as applied to claim 1, further in view of Ota et al. (JP403013558A). Uzoh, Edelstein et al. and Nagasaka et al. teach the step of forming the metal second film by a process selected from PVD, CVD, electroplating and electroless plating, and forming the metal first film by electroless plating (see 102 rejections above), but does not teach the step of electroless plating in a reducing environment.

Ota et al. teaches electroless plating in a reducing environment (constitution). At the time of the invention it would have been obvious to combine the electroless plating methods of Uzoh, Edelstein et al. or Nagasaka et al. with the reducing atmosphere of Ota et al. in order to prevent oxidation.

Allowable Subject Matter

Claims 33-36 are allowed.,

Claim 2, 4-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: The prior art of record does not teach or suggest either alone or in combination a process as recited by claims 2, 24-26 and 31-32, particularly electrically testing the device by probing the metal second film; or a process as recited by claim 4, particularly the metallization copper pad is metal-six copper (M6 Cu); or a process as recited by claim 5, particularly forming the second passivation layer over the metallization copper pad; and patterning the first and second passivation layers to expose at least the portion of the metallization copper pad; a process as recited by claim 9, particularly the metal first film is electrolessly plated with a composition including the complexing and buffering agent; and at least one pH adjusting agent; or a process as recited by claim 27, particularly forming the first passivation layer over the metallization copper pad; forming the second passivation layer over the metallization copper pad; and patterning the first and second

passivation layers to expose at least the portion of the metallization copper pad, wherein patterning the first and second passivation layers forms the slope that has the angle in the range from about 30 to 60 degrees; or a process as recited by claim 33, particularly forming the protective structure over the metallization copper pad, wherein the metallization copper pad makes contact with the device, and the protective structure includes the metal first film disposed above and on the metallization copper pad and the metal second film disposed above and on the metal first film, wherein the metal first film is electrolessly plated with the complexing and buffering agent, and at least one PH adjusting agent; and at the metal second film, wire bonding the device.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art of record that is cited as of interest is presented on the form-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is (703) 305-0723. The examiner can normally be reached on Monday-Thursday (7:30 a.m. to 6:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on Monday-Friday. The fax phone numbers for

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the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Kiley Stoner A.U. 1725
Kiley Stoner 5-24-03